buffer-storage amount detection circuit 209 respectively have the same functions as those shown in FIG. 7.

A motion prediction circuit 203 has the same function as the motion prediction circuit 103 shown in FIG. 7, and also stores the detected motion vector value of each block in a motion-vector-value memory 211. A block grouping section 212 arranges (classifies) blocks of the image data into groups, each of which includes blocks having the common directional vector and blocks surrounded by those blocks, according to motion vector value of each block. A function selector 213 provides a plurality of quantization step width functions, in each of which the storage amount "x" is a variable. For example, the function selector 213 has functions g1(x), g2(x), and g3(x), as shown in FIG. 9.

The function g1(x) should be employed for quantizing image data in a high level of preciseness, in association with a small quantization step width for the storage "x". The function g2(x) should be employed for quantizing image data in a relatively low level of preciseness, in association with an intermediate quantization step width for the storage "x". The function g3(s) should be employed for quantizing image data in a very low level of preciseness, in association with a high quantization step width for the storage "x".

For example, in the TV conference system, etc., input image data generally includes persons' image. Blocks of the face portion of the input image have the same directional vector, and occupy a relatively large area of a display screen. Hence a large number of blocks in the face portion constitute one group. Additionally, an image portion corresponds to a person's hand or an image portion corresponds to persons behind the centered person has the same motion. However, such an image portion occupies only a small area of the input image, and hence comprising only a small number of blocks forming a single group. Further, a tiny piece of image data having motion in itself is composed of a very small number of blocks. Further, a static image is displayed with a group of block without any motion.

A quantization step width calculation circuit 214 calculates an quantization step

width based on either one of the functions g1(x), g2(x) and g2(x), in association with each block portion, and informs the quantization circuit about the calculated step width. The transmission buffer circuit 208 transmits image data to a transmission path, in accordance with a suitable level of preciseness of the image data. Specifically, the important portion of the display screen, such as the face of the person in center of the view, is transmitted in a high level of preciseness, the hand portion of the person in the image data is transmitted in a relatively low level of preciseness, and a portion of the image data without any motion is transmitted in a very low level of preciseness.

Unexamined Japanese Patent Application KOKAI Publication No. H6-30402 discloses an image encoder which divides an input image into a plurality of blocks. determined whether each block is the most important portion of the input image based on a movement amount, size and frequency of a motion vector thereof, and assigns a relatively large number of codes to one block which has been determined as a block corresponding to the most important portion of the input image.

The following problems are found in the above prior art techniques.

As shown in FIG. 7, a circuit which employs the conventional image compression technique calculates a quantization step width in accordance with an amount of data stored in the transmission buffer, and quantizes image data. The same function for calculating the quantization step width is employed for any of the blocks of one display screen, regardless of whether each block corresponds to the most important portion of the input image. A problem arises in that a quite large amount of data is required for a portion of the image data which is not so important in the display screen, and resulting in a lack of data for expressing the most important portion, i.e. possibly the centered person in the display screen.

A circuit which employs the image compression technique disclosed in Unexamined Japanese Patent Application KOKAI Publication No. H6-169452 includes a plurality of image blocks arranged into groups based on motion vector values, and sets a quantization

step width in accordance with the number of blocks included in each group. Thus, in the case where the input image has no motion, the most important portion of the input image can not be transmitted with a high level of preciseness.

Similarly, in the image encoder disclosed in Unexamined Japanese Patent Application KOKAI Publication No. H6-30402, if there is a large motion vector in the input image data, a large number of blocks corresponding to the large motion vector are transmitted in a high level of preciseness. Thus, in the case where there is no motion in the input image, the important portion in the input image without any motion can not be transmitted in a high level of preciseness.

According to the structures of the image compression technique disclosed in Unexamined Japanese Patent Application KOKAI Publication No. H6-169452 and image encoder disclosed in Unexamined Japanese Patent Application KOKAI Publication No. H6-30402, in the case where the input image are moving in its entirety, both of the important portion and rest of portions in the input image are transmitted in the same level of preciseness. Therefore, the important portion of the input image can not be transmitted in a high level of preciseness.

## SUMMARY OF THE INVENTION

The present invention has been made in consideration of the above. It is accordingly an object of the present invention to provide an image encoder which can transmit the important portion, such as a person's view, of a display screen in a high level of preciseness even when there is no motion in the entire input image, an image encoding method and a program for realizing the above.

The present invention relates also to an image encoder which can transmit the important portion, such as a person's view, of a display screen in a high level of preciseness even when the whole image of the display screen is moving in its entirety, and an image encoding method and a program for realizing the above.

In order to achieve the above objects, according to the first aspect of the present